

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/27/11 has been entered.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 163, 164, 166, 168, 169, 171, 173 and 176 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger 6,396,148 (E) in view of Saia 5,973,908 (S).

Eichelberger discloses a die surround layer 104; die (chip) 102 coplanar with layer 104; first dielectric 106; patterned metal layers connected to pads on the die; and second dielectric layer 112. A comb shaped capacitor is not specifically disclosed by Eichelberger, however, Saia discloses a similar chip arrangement with a comb-shaped capacitor integrated with the metalization attached to pads on the chip. It would have been clearly obvious to practice the teachings of Eichelberger with Saia to form a multichip module as E with comb-shaped capacitors as S for integrating high capacity capacitors needed for de-coupling, protection, or other circuitry requirements.

Applicant's claim 163 is obvious to one of ordinary skill in view of the applied art. Claim

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164 is rejected because Saia discloses a portion of the capacitor (20) over the die 68.

Claim 166 is rejected as polyimide or polymer dielectric is disclosed by Saia or

Eichelberger. Claim 168 is rejected as E discloses copper. Claim 169 is rejected as S

discloses polyimide dielectric. Claim 171 is rejected as bumps are located over the

chips in E and the exact placement of bumps over any part of the structure is obvious

absent any unexpected results, none of which are presently apparent or disclosed.

Claim 173 is obvious because E discloses gold bumps over the underlying layers, and

there are no apparent unexpected results concerning the exact placement of bumps.

Moving the bumps anywhere over the chips or die-surround area is obvious design

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choice. There are no asserted unexpected results.

The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR* noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Court quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that "[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 550 U.S. at ____, 82 USPQ2d at 1396. Exemplary rationales that may support a conclusion of obviousness include:

- (A) Combining prior art elements according to known methods to yield predictable results;
- (B) Simple substitution of one known element for another to obtain predictable results;
- (C) Use of known technique to improve similar devices (methods, or products) in the same way;
- (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- (E) "Obvious to try" -- choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. See MPEP § 2143 for a discussion of the rationales listed above along with examples illustrating how the cited rationales may be used to support a finding of obviousness. See also MPEP § 2144 - § 2144.09 for additional guidance regarding support for obviousness determinations.

Regarding obvious placement of the bumps, see (E) above. Absent unexpected results placing the bumps over the die surround 104 rather than over the die 102 in Eichelberger, must be considered an obvious step over E, because it is a minor displacement of bump structure not disclosed by applicant or E to be significant, unobvious, or justified for patent protection. Metallization occurs over both dies and die

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surround layer material in E, therefore, over either structure it would be obvious to place solder balls, absent unexpected results, none of which are presently evident.

Claim 176 is rejected because E discloses substrate 101.

Claims 167, 170, 178 are rejected under 35 U.S.C. 103(a) as being unpatentable over E with S above, and further in view of Cole 5,745,984 (C).

In regard to BCB material, Cole discloses both polyimide, epoxy, and BCB form advantageous interlevel dielectric material or insulation layer material for IC devices and IC packages. It would have been obvious to practice either material for dielectric purposes and interlevel insulation layering in E with S, as the materials are obvious substitutions. Claims 167, 170, and 178 are obvious structure. See (B) in the KSR citation above.

Claim 177 is rejected under 35 U.S.C. 103(a) as being unpatentable over E with S and C above, and further in view of Wagner 5,196,377.

Regarding silicon substrates, Wagner discloses silicon substrates are beneficial for heat sink conduction, thermal matching to silicon dies, stress reduction, etc. For these advantages, it would have been obvious to practice a device as E with S and C above, with a silicon substrate. Claim 177 is obvious structure.

Claims 179-210 are rejected under 35 U.S.C. 103(a) as being unpatentable over E with S, C and Wagner, above, and further in view of Wachtler 6,707,124.

In regard to connecting two pads on a single die, Wachtler discloses in figure 22 such configuration, which would have been obvious for E with S, C and Wagner, in order to connect transistors or other devices on a single chip with adjacent metallization.

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Claim 179 is obvious structure. Claims 180-186 are also rejected as above. Claims 187-189 are rejected as the connection can be labeled or obviously function as either power or ground or signal, there being no specific circuitry claimed to distinguish over the connections and circuitry of the applied art. In regard to intended use:

>While features of an apparatus may be recited either structurally or functionally, claims directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. >*In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); <*In re Donly*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device *is*, not what a device *does*." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

In regard to claim 190, a capacitor as in the applied art can comprise a capacitor filter. See also the above caselaw on intended use.

In regard to claims 191-193, the capacitor of the applied art inherently also comprises inductance and resistance as it comprises metal layers. There are no magnitudes of resistance, inductance or capacitance to distinguish the claims over the applied art. Further, the applied art discloses passive structures are well known in the art and would have been prima facie obvious to integrate with the IC dies in the packages disclosed in the prior art. See Cole for example disclosing passive elements. Claims 194-196 are rejected as above. Claims 197-210 are also rejected as above, noting also that copper metallization is disclosed in the prior art, e.g. Cole.

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Claims 163,164,166-171,173,176-210 are rejected under 35 U.S.C. 103(a) as being unpatentable over E with S, C, Wachtler, Wagner, and further in view of Ng 5,583,259 and Pedder 5,717,246.

In regard to particular comb-shaped capacitor structure, Ng suggests such structure in metallization layers to increase capacitance. It would have been obvious to practice comb-shaped capacitors in the applied art to enable capacitor filter or other capacitor comprised circuitry. Further, Pedder discloses passive “comb” or interdigitated capacitor structures and inductor or resistor structures that are useful for communication circuitry. It would have been obvious to integrate such passive structures in the applied art for enabling useful communication circuitry.

Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEROME JACKSON JR whose telephone number is (571)272-1730. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerome Jackson Jr./
Primary Examiner, Art Unit 2815